TETA TO-0004
February 1992
Charles Gonzalez

# TEST EFFECTIVENESS TREND OBSERVATION

## Comparison of Voyager and Galileo Problem/Failures on Electrical and Electronic Subsystems

### CONCLUSION:

The Galileo electronic subsystems had a significantly higher number of environmental test induced problems than the Voyager electronic subsystems.

### DISCUSSION:

A survey was made of the environmental test problems/failures (P/Fs) on six Voyager and Galileo subsystems. The P/F totals were normalized to account for the different number of hardware sets being tested for the two programs, and for the relative complexity of the subsystems as represented by the parts count for each.

The following subsystems were considered: radio frequency (RFS); modulation/ demodulation (MDS); power and pyro (PWR/PY); command data CDS; attitude and articulation control (AACS); and data storage (DSS). These subsystems were selected because of the preponderance of electrical and electronic parts.

The attachment provides a plot of P/Fs resulting from environmental testing for the six different subsystems for each program. On Voyager the subsystem labeled the CDS (command data subsystem) was actually a combination of the CCS (command and control subsystem) and the FDS (flight data subsystem). This was done to make a comparison between equivalent hardware.

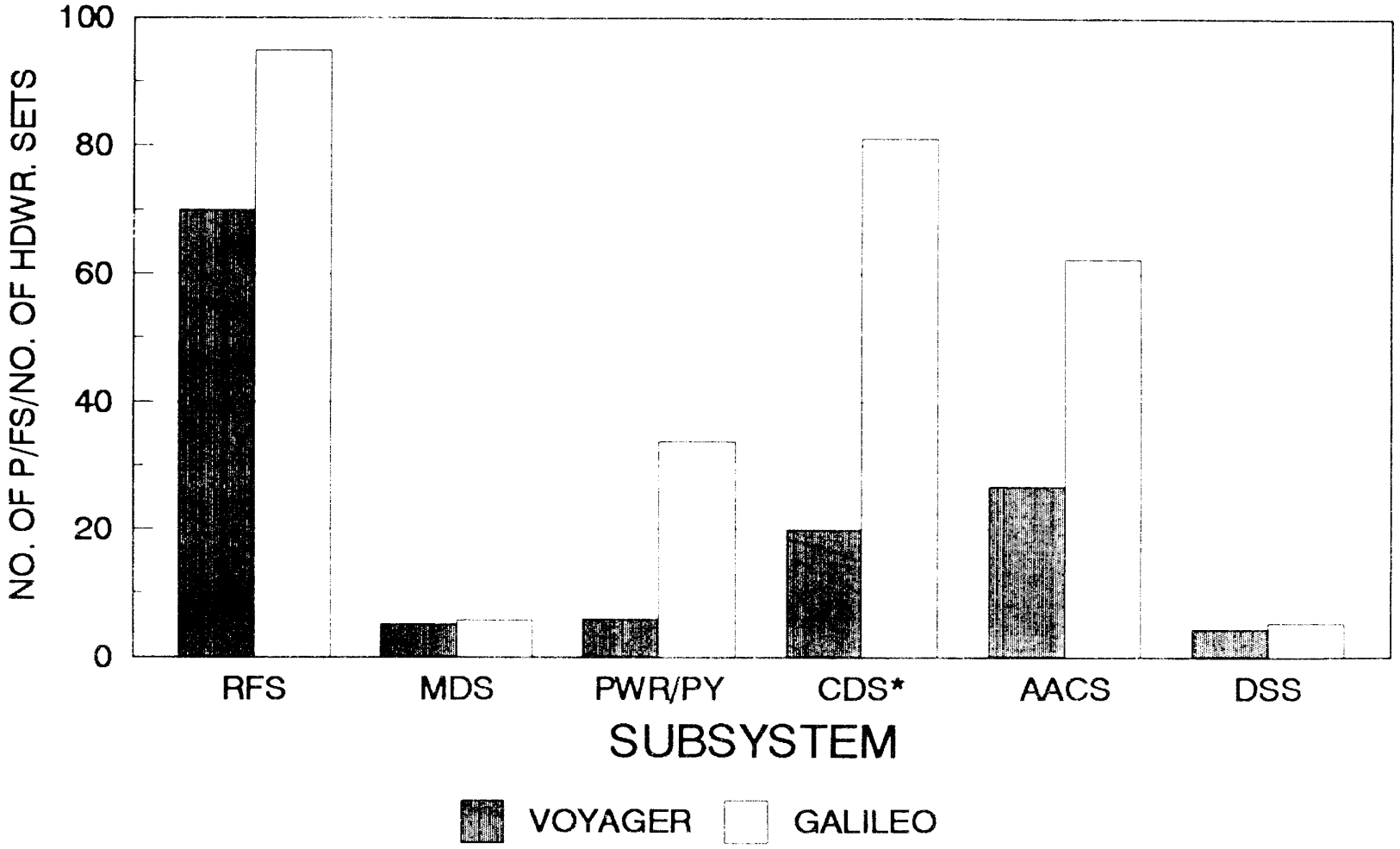
The results of the survey, presented in the attached plot, indicate that Galileo had a significantly higher number of total P/Fs for four of the subsystems, ranging from 1.4 to 5.7 times as many as found on Voyager. These subsystems were the RFS, PWR/PY, CDS and AACS; while, the MDS and DSS had only slightly more P/Fs on Galileo.

One possible explanation for the higher number of P/Fs on Galileo is that the more advanced level of technological maturity of the Galileo S/C may have led to this. This can be further broken down into several aspects. One is that the number of functions per parts count was greater for Galileo than Voyager. Other aspects of the issue of technological maturity may have a bearing on the greater number of P/Fs in the case of Galileo. This would be an appropriate concern for further consideration of this issue pursuant to more in-depth studies to follow.

Jet
Propulsion
Laboratory

# VOYAGER & GALILEO P/Fs

## ELECTRICAL & ELECTRONIC SUBSYSTEMS




* ON VOYAGER CDS COMPRISED OF CCS & FDS